Patent Claims

1. A device for the electrochemical detection of at least one biochemical molecule - contained in a liquid - from a group of predetermined biochemical molecules, having
a means (1) for taking up the liquid, said means having at least one reference electrode (RE) and at least one counterelectrode (GE) and also a multiplicity of working electrodes (AE1, AE2, AE3), at least one working electrode (AE1, AE2, AE3) being provided for the detection of each biochemical molecule, said working electrode being coated with a molecule that is complementary to the respective biochemical molecule, so that the biochemical molecules can be detected simultaneously,
a potentiostat (P) for generating a predetermined voltage profile between the working electrodes (AE1, AE2, AE3) and the reference electrode (RE),
a current/voltage converter (S1, S2, S3) being connected downstream of each of the working electrodes (AE1, AE2, AE3), the current/voltage converters (S1, S2, S3) holding all of the working electrodes (AE1, AE2, AE3) at the same potential and
a means (AD) for measuring the currents flowing through the working electrodes (AE1, AE2, AE3).

2. The device as claimed in claim 1, a plurality of interconnected or capacitively coupled reference electrodes (RE) being provided.

3. The device as claimed in claim 1 or 2, a plurality of interconnected counterelectrodes (GE) being provided.

4. The device as claimed in one of the preceding claims, the measuring means (AD) having an analog-to-digital converter.

5. The device as claimed in one of the preceding claims, the current/voltage converter (S1, S2, S3) being a current follower having a first operational amplifier (OP1), a noninverting input (OP1+) of the first operational amplifier (OP1) being grounded and the inverting input (OP1-) thereof being connected via a first resistor (R1) to the output of the first operational amplifier (OP1) and to the working electrode (AE1).

6. The device as claimed in one of the preceding claims, a capacitance being connected in parallel with the first resistor (R1).

7. The device as claimed in one of the preceding claims, it being possible for first resistors (R1) of different magnitudes to be connected in between the inverting input (OP1-) and the output of the first operational amplifier (OP1) for the purpose of setting the current measurement range.

8. The device as claimed in one of the preceding claims, the biochemical molecule to be detected being a nucleic acid and the complementary biochemical molecules being nucleic acids that are complementary to the nucleic acid to be detected.

9. The device as claimed in one of the preceding claims, the potentiostat (P) having a second operational amplifier (OP2), which is connected as a voltage follower and to whose noninverting input (OP2+) the reference electrode (RE) is connected.

10. The device as claimed in one of the preceding claims, the potentiostat (P) having a third

operational amplifier (OP3), to whose output the counterelectrode (GE) is connected and whose inverting input (OP3-) is connected via a second resistor (R2) to the output of the second operational amplifier (OP2) and is connected via a third resistor (R3) to a device for generating a selectable desired voltage, and the noninverting input (OP3+) of the third operational amplifier (OP3) being grounded.

11. The device as claimed in one of the preceding claims, a capacitance being connected in between the output of the third operational amplifier (OP3) and the inverting input (OP3-) thereof.

12. A method for the electrochemical detection of at least one biochemical molecule - contained in a liquid - from a group of predetermined biochemical molecules, having the following steps of:

a) providing a means (1) for taking up the liquid, the means (1) having at least one counterelectrode (GE) and a reference electrode (RE) and also a multiplicity of working electrodes (AE1, AE2, AE3), at least one working electrode (AE1, AE2, AE3) being provided for the detection of each biochemical molecule, said working electrode being coated with a molecule that is complementary to the respective biochemical molecule, so that the biochemical molecules can be detected simultaneously,

b) bringing the liquid into contact with the working (AE1, AE2, AE3), counter- (GE) and reference electrodes (RE),

c) simultaneously applying a predetermined voltage profile between the working electrodes (AE1, AE2, AE3) and the reference electrode (RE), and

d) measuring the currents flowing through the working electrodes (AE1, AE2, AE3), all of the

working electrodes (AE1, AE2, AE3) being held at the same potential during the measurement.

13. The method as claimed in claim 13, the measurement being carried out in parallel or by means of multiplexing.

14. The method as claimed in either of claims 13 and 14, the voltage present between the working electrodes (AE1, AE2, AE3) and the reference electrode (RE) being regulated with a potentiostat (P).